

**PU020259 (JP200194963) ON 8469**

- (19) Patent Agency of Japan (JP)
- (12) Official report on patent publication (A)
- (11) Publication number : 2001-094963
- (43) Date of publication of application : 06.04.2001
- (51) Int.Cl. H04N 7/173 G06F 13/00
- (21) Application number: 11-265025
- (22) Date of filing: 20.09.1999
- (71) Applicant: Nippon Telegr & Teleph Corp <NTT>
- (72) Inventor: Kiyosue Tomoyuki, Sugawara Shohei, Masaki Shigeki
- (54) Title of the invention: Video transmission method, intermediation server device and program recording medium
- (57) Abstract:

Problem to be solved: To provide a video transmission method that can efficiently transmit a required video image, when adopting a configuration of transmission of a video image by a server client system and to provide an intermediation server device used for the realization.

Solution: A terminal transmits terminal attribute information to an intermediation server device, the intermediation server device receiving the information decides video quality on the basis thereof, makes a request to a video terminal to transmit a video image with designation the video quality, the video

transmission terminal receiving the request transmits the video image with the designated video quality to the intermediation server device, and the intermediation server device transmits the received video image to a video reception terminal. Thus, when the terminal requires a video image with high image quality, the video image with high image quality is transmitted, and when a terminal requires a video image with image quality which is not so high, the video image having less image quality is transmitted. Thus, the required video image can efficiently be transmitted.

### **[Claims]**

[Claim 1] An image transmission method used with a video communication system provided with a video transmission terminal, a video reception terminal, and an intermediation server device, a video transmission terminal and a video reception terminal transmit terminal attribute information to an intermediation server device and an intermediation server device determines image quality in response to transmission of this terminal attribute information based on it, specify it, require transmission of an image of a video transmission terminal, and a request to send of this image is received, an image transmission method transmitting an image sent from a video transmission terminal to a video reception terminal after a video transmission terminal transmits an image according to

image quality specified to an intermediation server device and an intermediation server device receives a request to send from a video reception terminal in response to transmission of this image.

[Claim 2] An intermediation server device that is connected to a terminal which transmits and receives an image and performs intermediation service of an image over this terminal, including a terminal attribute reception part that receives terminal attribute information sent from a terminal, a deciding part that determines image quality based on terminal attribute information that the mentioned above terminal attribute reception part receives, a demand part that specifies image quality which the mentioned above deciding part determines to a terminal, and publishes a request to send of an image, an image reception part that receives an image answered and sent to a video transmission demand that the mentioned above demand part publishes and a transmission part that transmits an image which the mentioned above image reception part receives to this terminal after receiving a request to send from a terminal.

[Claim 3] An intermediation server device according to claim 2 characterized by that a terminal attribute reception part receives position information of the other self of a terminal operator on virtual space that a terminal shares as terminal attribute information in the intermediation server device.

[Claim 4] An intermediation server device according to claim 2 characterized by that a terminal attribute reception part receives a terminal operator's attribution information as terminal attribute information in the intermediation server device.

[Claim 5] A program recording medium with which a program used for realization of an intermediation server device that is connected to a terminal which transmits and receives an image and performs intermediation service of an image over this terminal is stored, terminal attribute reception that receives terminal attribute information sent from a terminal, decision processing that determines image quality based on terminal attribute information received by the mentioned above terminal attribute reception, a request process that specifies image quality determined by the mentioned above decision processing to a terminal, and publishes a request to send of an image, image reception that receives an image answered and sent to a video transmission demand published by the mentioned above request process, a program recording medium characterized by that a program that makes a computer perform transmitting processing that transmits an image received by the mentioned above image reception to this terminal after receiving a request to send from a terminal is stored.

## **[Detailed description of the invention]**

[0001]

[Field of the invention] An image transmission method in the server client system with which this invention works on networks, such as the Internet, an image transmission method that enables it to transmit efficiently the image needed especially about the intermediation server device used with the image transmission method, and the program recording medium used for realization of the intermediation server device, it is related with the intermediation server device used with the image transmission method and the program recording medium used for realization of the intermediation server device.

[0002] Interspace was developed as a cyber-communication platform. This Interspace shares between a lot of people the 3D virtual space built on the network, it is the technical architecture that the persons of a remote place meet on space and enjoys communication or peruses multimedia contents, carrying out fork through the inside of space or enables offer of various virtual space services of shopping, education, a virtual experience, etc.

[0003] In systems, such as this Interspace, although the image will be transmitted between terminals by the network, the transmission of an image needs to build the art of enabling it to transmit the image needed efficiently, from that transmission quantity being large.

[0004]

[Description of the prior art] When an image is transmitted to a client from a client in a server client system, an image transceiver server is prepared and this image transceiver server receives the image sent from the video transmission side client, and by transmitting it to an image reception side client, it is processing so that an image may be transmitted to a client from a client.

[0005] When taking this composition, and in conventional technology, as shown on drawing 10, the video transmission side client, sending the image to an image transceiver server is always continued by making an image with the image quality fixed with a self-device into a transmission object and the image transceiver server is processed so that the image sent may be transmitted to an image reception side client ignited by the video transmission demand from an image reception side client.

[0006]

[Problems to be solved by the invention] However, when such conventional technology is followed, there is a problem that the image needed cannot be transmitted efficiently.

[0007] Namely, although the image of high resolution is originally more nearly required, and the image of such high resolution is not sent or it originally ends with the image of a low resolution more, while the image needed is not transmitted as the image of high resolution will be

sent from it, there is a problem that the image needed the difficulty of swerving because use of a circuit has futility cannot be transmitted efficiently.

[0008] When taking the composition that transmits an image with the server client system that this invention is made in view of this situation, and works on networks, such as the Internet, it aims at offer of the new image transmission method that enables it to transmit the image needed efficiently, offer of the new agency server apparatus used with the image transmission method, and offer of the new program recording medium used for realization of the intermediation server device.

[0009]

[Means for solving the problem] Principle composition of this invention is shown on drawing 1.

[0010] In a drawing, 1 is an intermediation server device according to this invention, 2a is a video transmission terminal that transmits an image in response to processing of the intermediation server device 1, 2b is a video reception terminal that receives an image in response to processing of the intermediation server device 1 and 3 is a networks that connect the intermediation server device 1, the video transmission terminal 2a and video reception terminal 2b.

[0011] The intermediation server device 1 of this invention is provided with the communication control part 10 that controls communication between the video transmission terminal 2a and video reception terminal 2b, the terminal attribute reception part 11 that receives terminal attribute information sent from the video transmission terminal 2a and video reception terminal 2b, the terminal attribute storage part 12 that stores terminal attribute information that the terminal attribute reception part 11 received, the image quality determination part 13 that determines image quality based on terminal attribute information that the terminal attribute reception part 11 received, the image demand part 14 that specifies image quality which the image quality determination part 13 determined to the video transmission terminal 2a, and publishes a request to send of an image, the image reception part 15 that receives an image answered and sent to a video transmission demand which the image demand part 14 published, the video storing part 16 which stores an image which the image reception part 15 received, and the video transmission part 17 that transmits an image which the image reception part 15 received to video reception terminal 2b.

[0012] On the other hand, the video transmission terminal 2a is provided with the terminal attribute transmission part 20a that transmits terminal attribute information to the intermediation server device 1, the



video transmission part 21a that transmits an image according to image quality which the intermediation server device 1 specifies to the intermediation server device 1.

[0013] On the other hand, video reception terminal 2b is provided with the terminal attribute transmission part 20b that transmits terminal attribute information to the intermediation server device 1, the image reception part 22b that receives an image sent from the intermediation server device 1.

[0014] Realizing by a program and a function that the intermediation server device 1 of this invention has specifically this program, this invention will be realized in it being stored on a floppy disk etc. or being stored in disks, such as a server, etc., being installed in the intermediation server device 1 from them and operating on a memory.

[0015] In a video communication system of this invention constituted in this way, the video transmission terminal 2a and video reception terminal 2b transmit position information of the other self of a terminal operator on virtual space that a terminal shares as terminal attribute information as opposed to the intermediation server device 1 or transmit a terminal operator's attribution information as terminal attribute information.

[0016] The terminal attribute reception part 11 of the intermediation server device 1 receives this terminal attribute information sent, that received terminal attribute information is matched with a user ID (a transmitting agency and a reception destination are described) in the same space, and the terminal attribute storage part 12 stores it, as shown on drawing 2. And in response to terminal attribute information stored by this terminal attribute storage part 12, the image quality determination part 13 determines image quality based on this terminal attribute information.

[0017] For example, when a terminal operator's other self faces in a near distance mutually, when image quality of high resolution is determined or terminal operators are a patient and a doctor, based on terminal attribute information sent from the video transmission terminal 2a and video reception terminal 2b, image quality is determined as image quality of resolution which is not so high is determined to the doctor's image, while determining image quality of high resolution to the patient's image.

[0018] In response to this determination, the image demand part 14 specifies image quality that the image quality determination part 13 determined to the video transmission terminal 2a and publishes a request to send of an image.

[0019] In response to a request to send of an image sent from this intermediation server device 1, the video transmission terminal 2a transmits an image according to image quality specified to the intermediation server device 1.

[0020] The image reception part 15 of the intermediation server device 1 receives this image sent, that received image is matched with terminal ID of a transmitting agency and the video storing part 16 stores it, as shown on drawing 3.

[0021] And from an image stored by this video storing part 16 and a user ID in the same space stored by the terminal attribute storage part 12, the video transmission part 17 transmits this image stored to video reception terminal 2b of a distribution destination, when a request to send of an image is received.

[0022] Thus, in an image transmission method of this invention, as shown on drawing 4, the video transmission terminal 2a and video reception terminal 2b transmit terminal attribute information to the intermediation server device 1 and the intermediation server device 1 determines image quality in response to transmission of this terminal attribute information based on it, specify it, require transmission of an image of the video transmission terminal 2a, and a request to send of this image is received, the video transmission terminal 2a transmits an image according to image quality specified to the intermediation server device 1, in

response to transmission of this image, the intermediation server device 1 processes an image sent from the video transmission terminal 2a so that it may transmit to that video reception terminal 2b in response to a request to send from video reception terminal 2b.

[0023] Thus, when video reception terminal 2b needs an image of high image quality from the video transmission terminal 2a in this invention using terminal attribute information. When an image of high image quality is transmitted to video reception terminal 2b and video reception terminal 2b needs an image of image quality that is not so high from the video transmission terminal 2a, an image needed can be efficiently transmitted from processing an image of image quality which video reception terminal 2b needs so that it may transmit to video reception terminal 2b as an image of image quality that is not so high is transmitted to video reception terminal 2b.

[0024]

[Embodiment of the invention] Next, according to the embodiment applied to Interspace, this invention is explained in details.

[0025] Interspace, making one participate as an avatar (an operator's other self), and moving this avatar freely into the 3D virtual space constituted from CG. It is a platform that supports cyber-communication in the virtual space seen from the viewpoint of an avatar, and it becomes possible for those who operate a terminal to

participate in 3D virtual space by an avatar with a sound and a face picture, and to consider communication of real time as other participants.

[0026] The system configuration of this Interspace is represented on drawing 5.

[0027] As shown on this system configuration drawing, Interspace is provided with the user managing server 40 as a server function, world managing server 41, cell world server 42, the face picture server 43, the voice server 44, the digital sound server 45 and the contents server 46.

[0028] Session information after registered user information manages this user managing server 40 and logging in to Interspace until it logs out is managed. The world managing server 41 manages the information about all the fields (world) in virtual space. The cell world server 42 manages the position information on user avatar in the 1 field (world) in virtual space.

[0029] The face picture server 43 performs reception of the face picture from the client 60, and transmission according to a demand. The voice server 44 manages exclusive PBX and the mixer that connects the circuit for voice communications with the client 60. The digital sound server 45 transmits and receives voice data with the client 60 of an Interspace base. An Interspace system chooses in a world which shall be used between the voice server 44 and the digital sound server 45 for every world.

The contents server 46 performs downloading of the contents data to the client 60 on demand.

[0030] Here, these programs prepared as a server of Interspace are storable in a recording medium with suitable semiconductor memory that a computer can read.

[0031] On the other hand, the client 60 connected to these servers via the network 50 is provided with the client communication module 61, client main module 62, client interface module 63, client contents managing module 64.

[0032] This client communication module 61 is a module which performs communication with servers other than contents server 46. The client main module 62 is a module which interprets inter-script that has described the event in a world. The client interface modules 63 are modules, such as GUI of the client 60. The client contents managing module 64 is a module that requires download of the contents server 46.

[0033] Here, these programs prepared as a client of Interspace are storable in a recording medium with suitable semiconductor memory etc. that a computer can read.

[0034] One example of this invention at the time of applying to the Interspace that takes drawing 6 and such a system configuration is represented.

[0035] In this example, the composition that realizes this invention using the cell world server 42 which

manages the position information on user avatar in the 1 field in virtual space and reception of the face picture from the client 60 and the face picture server 43 that transmits the face picture to the client 60 is taken.

[0036] 60a shown on a drawing is the video transmission side client, and 60b is an image reception side client.

[0037] The operating sequence of the example constituted in this way by drawing 7 is represented. Next, according to this operating sequence, the operation processing of the example constituted in this way is explained.

[0038] (1) While the video transmission side client 60a always sends the position coordinate information of the avatar that a self-user specifies to the cell world server 42 that functions as a position coordinate managing server, the image of the user's face assigned to the avatar is sent to the face picture server 43 that operates as an image transceiver server.

[0039] (2) It can come, simultaneously the image reception side client 60b also always sends the position coordinate information of the avatar that a self-user specifies to the cell world server 42 which functions as a position coordinate managing server.

[0040] (3) The cell world server 42 that operates as a position coordinate managing server, from the position coordinate information sent from the video transmission side client 60a, and the position coordinate information

sent from the image reception side client 60b. It judges on the basis of the criteria defined preliminary, and when judging that the criteria were satisfied, specific image quality is specified and transmission of the image of the face that has the image quality to the video transmission side client 60a is required.

[0041] For example, while an avatar looks at a mutual face picture in virtual space, when talking, when judging whether it is having faced mutually from the distance of both in the inside of virtual space, and direction and judging with having faced mutually, usually, it is required that the image of the face of high resolution should be transmitted from the video transmission side client 60a that has transmitted the image of the face of a low resolution (still picture).

[0042] (4) Ignited by this demand, the video transmission side client 60a replaces the image of a face with the image quality specified from the cell world server 42 with the image of the face that had transmitted by then, and transmits to the face picture server 43.

[0043] (5) Transmit the image of a face with that image quality to which the face picture server 43 has been sent from the video transmission side client 60a in response to transmission of the image of this face to the image reception side client 60b after receiving the video transmission demand from the image reception side client 60b.



[0044] By thus, the thing for which the image quality of the image that transmits to the image reception side client 60b from the video transmission side client 60a is changed in the example of drawing 6 according to the position coordinate information of an avatar. When transmission of the image of high resolution is not demanded, while transmitting the image of a low resolution or a still picture, when transmission of the image of high resolution is required, it realizes transmitting the image needed efficiently by replacing with the image of the low resolution and still picture and transmitting the image of high resolution.

[0045] Although the face picture server 43 that operates as an image transceiver server took the composition of on the other hand determining the transmitting opportunity of the image which transmits to the image reception side client 60b as a target, in this example, it cannot be overemphasized that it is possible for the image reception side client 60b to use the method of requiring transmission for the face picture server 43.

[0046] Other examples of this invention are represented to drawing 8.

[0047] This example applies this invention to image transmission of the non equilibrium between the medical practitioner operation side client 60c and the patient operation side client 60d and assumes that the avatar in both clients meets in virtual space.

[0048] The operating sequence of the example constituted in this way by drawing 9 is represented. Next, according to this operating sequence, the operation processing of the example constituted in this way is explained.

[0049] (1) The medical practitioner operation side client 60c sends the operator attribution information a self-user indicates it to be that he is a medical practitioner to the user managing server 40 at the time of user-data registration.

[0050] (2) With this, the patient operation side client 60d sends the operator attribution information a self-user indicates it to be that he is a patient to the user managing server 40 at the time of user-data registration.

[0051] (3) In response to this operator attribution information the user managing server 40, while requiring that it should opt for the transmission instruction of the image of a low resolution as transmission instruction to the medical practitioner operation side client 60c and the image of the face of a low resolution should be transmitted to the medical practitioner operation side client 60c, it opts for the transmission instruction of the image of high resolution as transmission instruction to the patient operation side client 60d and it is required from the patient operation side client 60d that the image of the face of high resolution should be transmitted.

[0052] (4) In response to specification of this image quality, the medical practitioner operation side client 60c transmits the image of the face of the medical practitioner according to a low resolution to the face picture server 43.

[0053] (5) With this, the patient operation side client 60d transmits the image of the face of the patient according to high resolution to the face picture server 43.

[0054] (6) After receiving the video transmission demand from each client in response to transmission of the image of the face of these, the face picture server 43, while transmitting the image of the face of the patient according to high resolution to the medical practitioner operation side client 60c, the image of the face of the medical practitioner according to a low resolution is transmitted to the patient operation side client 60d.

[0055] Thus, in the example of drawing 8, the medical practitioner side can converse with a medical practitioner, while being able to perform a remote medical examination, looking at a patient's high resolution image and the patient side looks at the image that does not apply load to hardware more than needed.

[0056] Namely, it can realize now in the same architecture that the image of usual resolution sufficient instead of the image of high resolution without necessity to have a dialog can be given to the patient

side, and the image of the high resolution that is needed for the remote medical examination instead of the dialog purpose can be given to the medical practitioner side.

[0057] Although this invention was explained according to the graphic display example, this invention is not limited to this. For example, although application to Interspace was made into the example and this invention was explained in the example, as for this invention, the application is not restricted to Interspace.

[0058]

[Effect of the invention] As explained above, when the video reception terminal needs the image of high image quality from the video transmission terminal in this invention using terminal attribute information, when the image of high image quality is transmitted to a video reception terminal and the video reception terminal needs the image of the image quality that is not so high from the video transmission terminal, the image needed can be efficiently transmitted from processing the image of the image quality that a video reception terminal needs so that it may transmit to the video reception terminal as the image of the image quality that is not so high is transmitted to a video reception terminal.

### **[Brief description of the drawings]**

[Drawing 1] is a principle line-block diagram of this invention.

[Drawing 2] is an example of the data stored by the terminal attribute storage part.

[Drawing 3] is an example of the data stored by the video storing part.

[Drawing 4] is an operating sequence of the image transmission method of this invention.

[Drawing 5] is an explanatory view of Interspace.

[Drawing 6] is one example of this invention.

[Drawing 7] is an operating sequence of an example.

[Drawing 8] are other examples of this invention.

[Drawing 9] is an operating sequence of an example.

[Drawing 10] is an explanatory view of conventional technology.

### **[Description of numerals]**

1 Intermediation server device

2a Video transmission terminal

2b Video reception terminal                      3 Network

10 Communication control part

11 Terminal attribute reception part

12 Terminal attribute storage part

13 Image quality determination part

14 Image demand part                      15 Image reception part

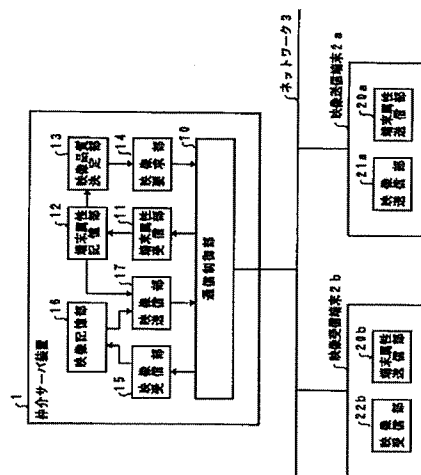
16 Video storing part                      17 Video transmission part

20a Terminal attribute transmission part

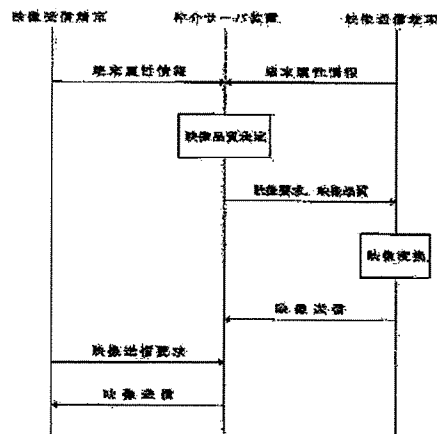
21a Video transmission part

## 22b Image reception part

### Drawing 1



### Drawing 4



### Drawing 2

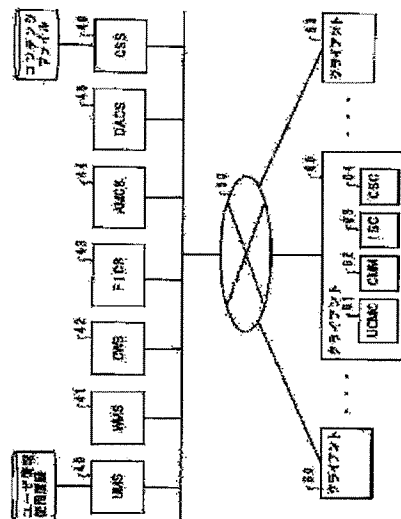
利用者ID	端末属性	同一空間内 利用者ID
A	XA	B
B	XB	A

映像受信端末の利用者：A  
映像送信端末の利用者：B

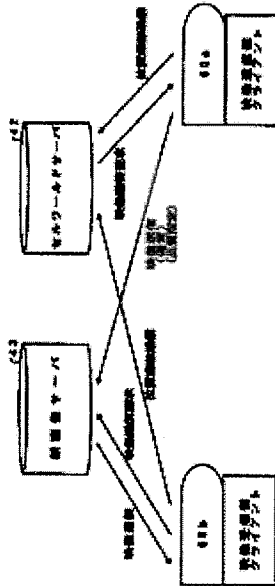
### Drawing 3

端末 1 D	映像データ
B	<端末Bから送信された映像データ>

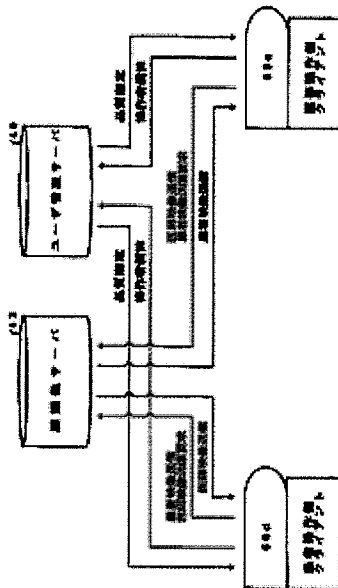
### Drawing 5



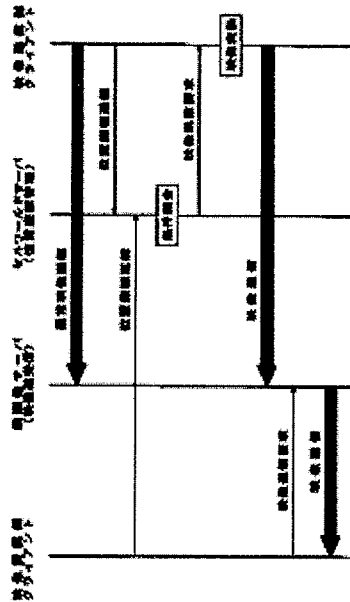
Drawing 6



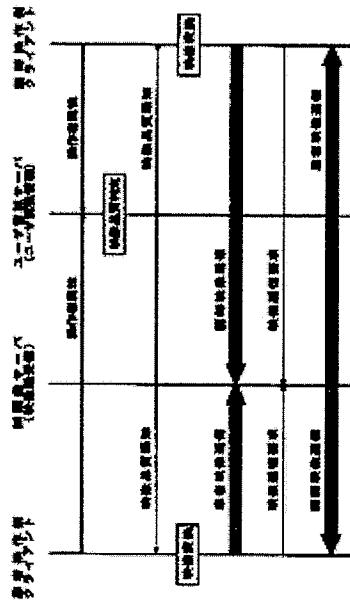
Drawing 8



Drawing 7



Drawing 9



Drawing 10

